



Huon Valley Council

ACID SULFATE SOILS AREAS REPORT

FEBRUARY 2022



Cover photo

Oblique satellite view looking north over the Huon River to Huonville. Egg Islands (left foreground) in the river and the bordering low-lying river banks extending north and northwest through Huonville to Ranelagh are rated as mostly low level Coastal Acid Sulfate Soils (ASS).

Image: Google Earth, 4 December 2019

Refer to this report as

Cromer, W. C. (2022). *Acid Sulfate Soils Areas Report*. Unpublished report for Huon Valley Council by William C. Cromer Pty Ltd, 6 February 2022.

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SUMMARY

Field inspections have been completed of 76 low-lying sites in coastal areas of Huon Valley municipality to review the previously mapped and published distribution of potential acid sulfate soils (PASS).

PASS is common in the municipality. If disturbed, these soils and sediments can generate sulphuric acid with the potential to cause environmental harm. Proponents of residential or other infrastructure development may be required by regulatory authorities to assess and if necessary manage PASS.

With minor exceptions described in this report, the previously mapped areas of PASS provide a sound basis for compiling a Specific Area Plan for acid sulfate soils, as part of the Local Provisions Schedule of the *Tasmanian Planning Scheme – Huon Valley Council*.

With minor amendment (suggested here) the Huon Valley Council draft Specific Area Plan for PASS adequately provides for the identification and management of acid sulfate soils in the municipality.



1 INTRODUCTION

1.1 Introduction

Huon Valley Council (HVC) is preparing Local Provision Schedules (LPS) as part of the Tasmanian Planning Scheme currently being adopted by various local governments.

The current report describes the occurrence of acid sulfate soils (ASS) in rural and residential areas of the municipality (Figure 1), to support the compilation of a Specific Area Plan (SAP) for ASS as part of the LPS.

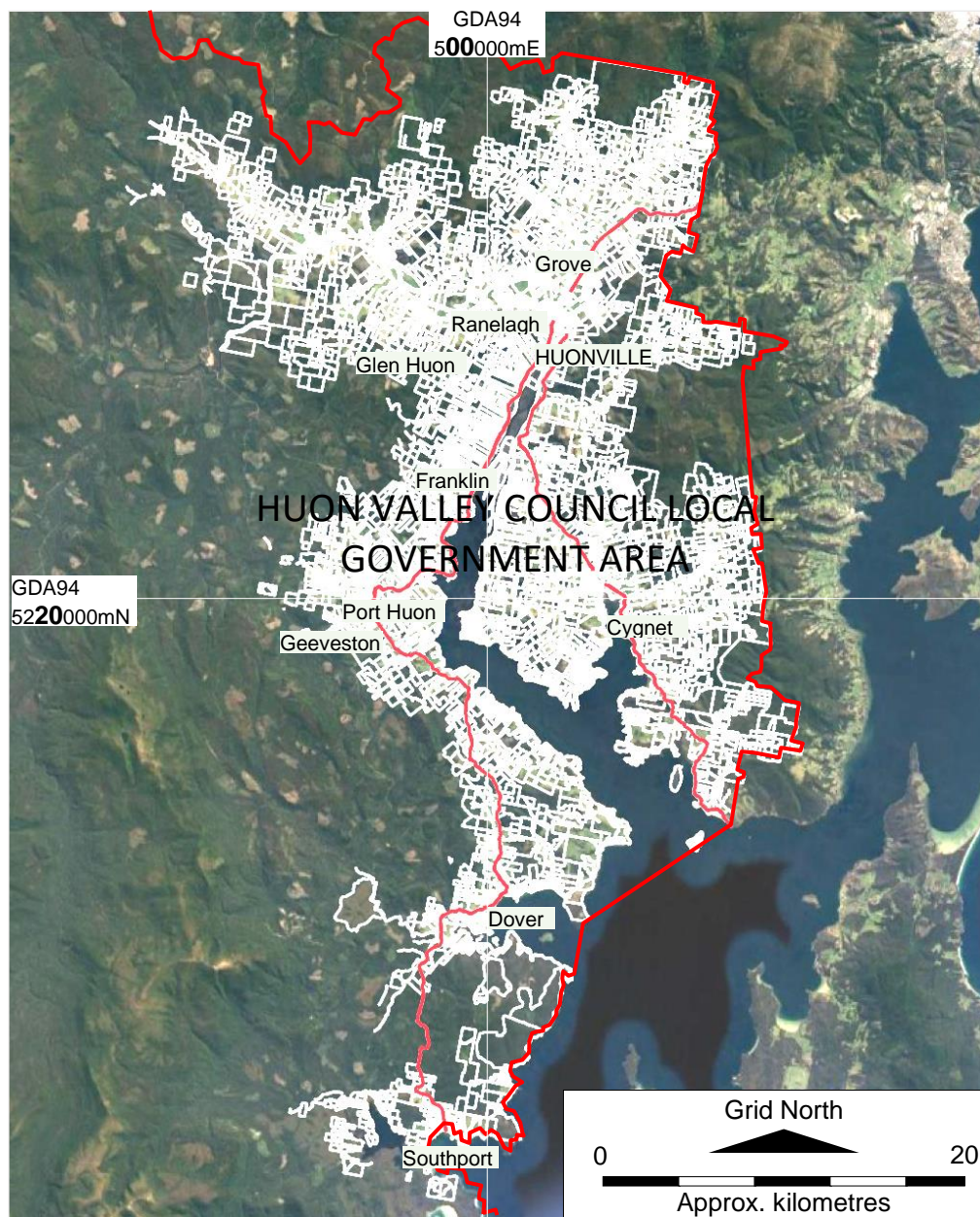


Figure 1. Residential and rural land in the Huon Valley Council Local Government Area.
Source: Huon Valley Council



1.2 Acid sulfate soils

1.2.1 Formation of acid sulfate soils

Acid sulfate soils underlie large areas of Australia's coastline, and they occur in many low-lying parts of the Huon Valley municipality.

ASS develops when sulfate-rich waters (for example, seawater, sewerage water) mix with soils or sediments which contain iron and organic matter.

In oxygen-depleted water-logged soil or sediment, the sulfate is converted to sulfide by microbial decomposition of the organic matter. The sulfide combines with iron (or other metals) to form iron (or other metal) sulfides. The situation remains benign until the soil or sediment is disturbed and exposed to oxygen: iron sulfide is then oxidised and converted to sulphuric acid. The acid can mobilise other metals and move elsewhere in the environment. Deleterious effects include dissolution of soil, rock and concrete, corrosion of metal, off-site soil contamination by heavy metals, and fish kills.

1.2.2 Types of acid sulfate soils

Coastal ASS

Coastal ASS develop in tidal areas, or are preserved in adjacent low-lying areas inundated by the sea in earlier times. For example, during the last interglacial warming about 120,000 years ago land up to about 20m above sea level (ASL) could have been affected. Coastal ASS could also have formed a metre or so above current sea level during the Holocene warming in the past 6,000 – 10,000 years or so.

Marine Subtidal/Intertidal ASS

Marine ASS sediments at and below mean sea level are permanently submerged (subtidal) or are intermittently submerged between high and low tides (intertidal). They may be exposed by moorings, bridge and pier constructions, dredging, the laying of submarine cables, etc.

Inland ASS

Inland ASS are at elevations greater than 20m above sea level, associated with inland water bodies and waterways which have not been connected to the sea. The only instance of inland ASS in the residential – rural areas of Huon Valley municipality is 20ha of forested and poorly-drained land at about 100m ASL on Herons Road inland from Waterloo, about one kilometre upstream from Rileys Creek Reservoir.

Inland ASS is not considered further in this report.

Actual and potential ASS

Usually, ASS locations are only confirmed as actual ASS (AASS) when soil or sediment is excavated and tested for its acidity and reaction to an oxidising agent (eg hydrogen peroxide, H_2O_2). When exposed, the soil is typically dark-coloured and acidic, and hydrogen sulfide gas (H_2S ; rotten egg gas) may be present. AASS reacts positively (it bubbles) to H_2O_2 with a further reduction in acidity as sulphuric acid is produced.

Potential ASS (PASS) areas are locations where ground conditions are similar to AASS areas, but where no material has been exposed and tested.



1.2.3 Coastal ASS in Tasmania and the Huon Valley municipality

Areas of Coastal PASS (<20mASL) have been mapped statewide in Tasmania and are available for viewing at www.thelist.tas.gov.au. Three categories of coastal PASS are described: Extremely low, Low, and High.

Coastal areas of Extremely Low PASS have a low (1 – 5%) probability of occurrence; Low PASS areas have a low (6 – 70%) chance of occurrence, and High PASS areas have a high (>70%) probability of occurrence.

Figure 2 is an example from www.thelist.tas.gov.au showing the three categories in the Huonville –Franklin area.

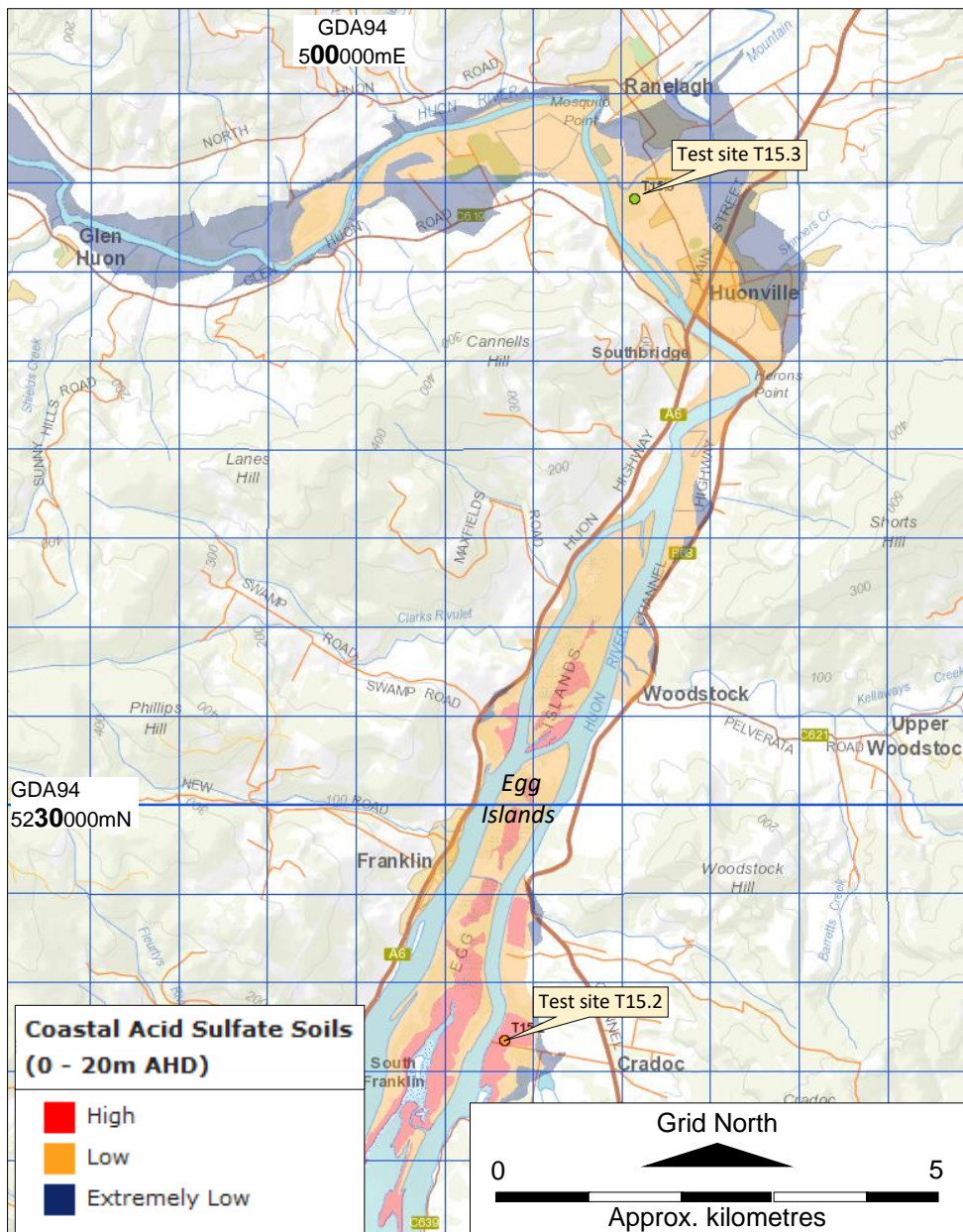


Figure 2. Coastal ASS in the Glen Huon – Franklin section of the Huon River. The Egg Islands and some adjacent river borders are of Low to High ASS. Low to Extremely Low ASS extends upstream from Huonville past Glen Huon. Test sites T15.2 and T15.3 (previously tested by others) near Cradoc and Ranelagh respectively are indicated. Note that the dark blue, orange and red colours for the extremely low, low and high PASS levels respectively differ from the blue, green and red depicted on the Detail Maps in Attachment 1.

Source: www.thelist.tas.gov.au

1.2.4 Managing acid sulfate soils

Landowners intending to develop coastal areas shown as PASS on map overlays may (depending on the scope of development) be required by regulators to assess whether ASS conditions exist, and if they do, to assess the level of risk and to formulate an ASS management plan for the development.

Assistance is provided by the *Tasmanian Acid Sulfate Soil Management Guidelines* (Department of Primary Industries, Parks, Water and the Environment, Hobart, December 2009). The *Guidelines* do not apply above 20m AHD¹. Figure 3 is a flow chart of the investigation process for PASS leading to a management plan.

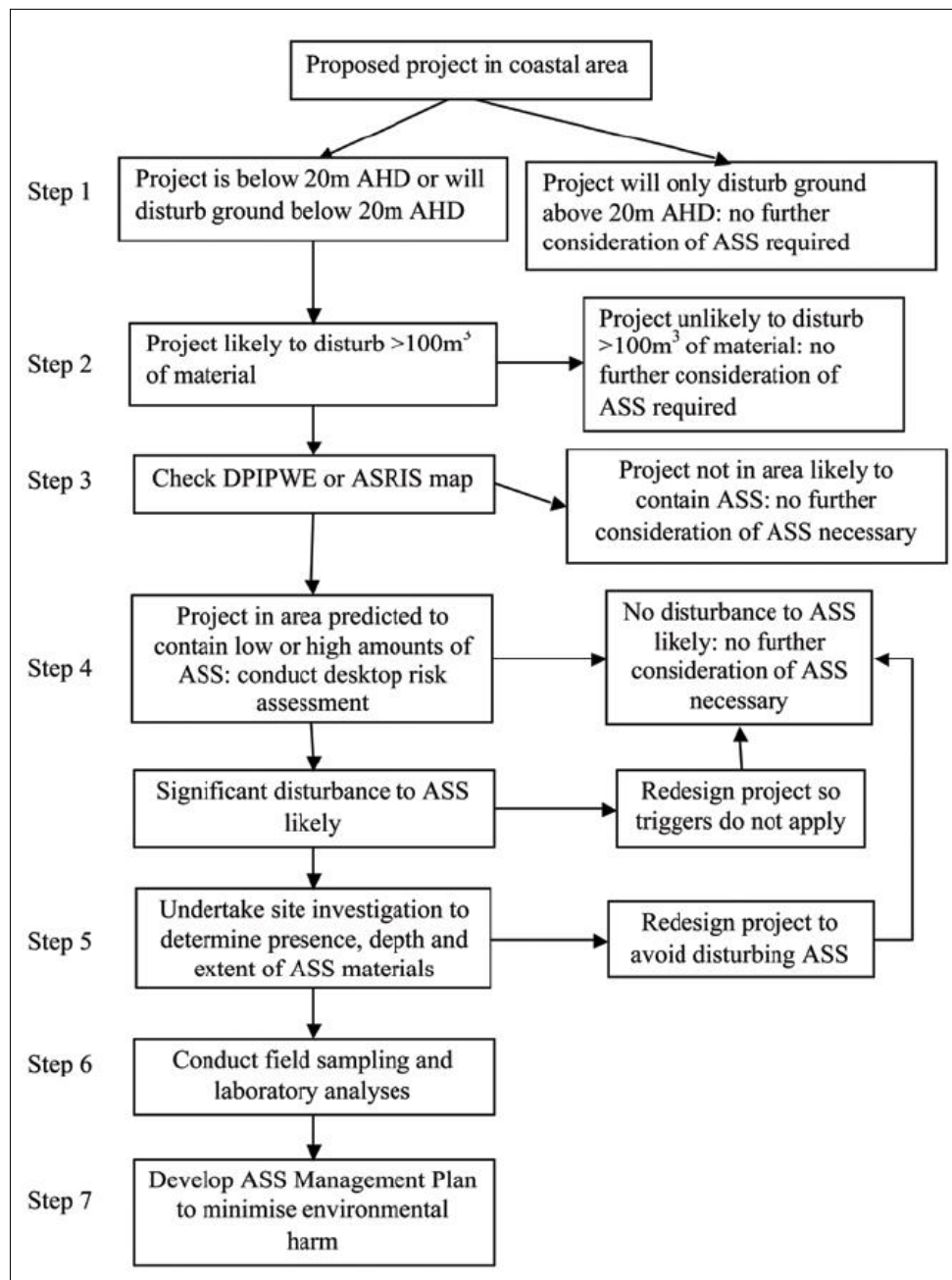


Figure 3. Flow chart for assessing and managing ASS for land development in a coastal area. Source: Figure 3 of the 2009 DPIPWE Guidelines.

¹ AHD = Australian Height Datum approximately the same as ASL. Zero AHD is very close to mean sea level.

2 METHODOLOGY FOR THIS REPORT

This report has adopted the following staged methodology:

1. ascertain from HVC the distribution of residential and rural land in the municipality (Figure 1),
2. review the map overlays from www.thelist.tas.gov.au showing the distribution of coastal, inland and subtidal/intertidal potential acid sulfate soils (PASS),
3. compare the PASS map overlays to Figure 1,
4. eliminate from further consideration the single small inland PASS area near Waterloo,
5. create Detail Maps covering the coastal and subtidal/intertidal PASS areas,
6. inspect, ground-truth and photograph most of the PASS areas on the Detail Maps,
7. revise where considered appropriate the distribution of PASS on the maps,
8. review the provisions of the draft HVC SAP for PASS,
9. compile the present report with revised Detail Maps, field notes and selected site photographs, and if appropriate, suggest amendments to the draft SAP.

3 RESULTS

3.1 Presentation of results

Attachment 1 presents nine Detail Maps showing the published extent of PASS in Huon Municipality and (from the present field survey of 76 sites) some suggested changes to the distribution.

Site photographs in Attachment 2 illustrate areas of PASS, and field notes are listed in Attachment 3.

3.2 Results of field survey

The Detail Maps (Attachment 1) show that:

- Coastal PASS and subtidal/intertidal PASS occurs throughout the areas inspected,
- Three high PASS areas occur:
 - on the Egg Islands in the Huon River,
 - on low-lying river flats (“The Tongue”) on the eastern side of the mouth of the Lune River at Lune River,
 - and as a small area on the northern bank of the Esperance River west of the Dover Golf club.
- Low PASS occur on the Egg Islands in the Huon River, and at the heads of bays and estuaries (eg Waterloo Bay, Hospital Bay, Esperance Narrows, Hastings Bay), and
- Areas of extremely low PASS generally back low PASS areas.



4 DISCUSSION

4.1 Suggested changes to the distribution of PASS soils and sediments

The field survey has identified eleven sites as probably requiring a modification to their PASS status. The sites are summarised in Table 1, and (except for sites 18, 24 and 66) the proposed changes are depicted in the Detail Maps in Attachment 1.

4.2 Suggested addition to the draft Potential Acid Soils SAP

The HVC draft SAP HUO-S4.0 for ASS refers to PASS.

In Section HUO-S4.4 (Definition of Terms), ASS “means soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of iron sulfides.” but PASS is not defined.

It is suggested that PASS should also be defined. A workable definition could be: PASS “means soil or sediment that because of its coastal location, or inland location in or near water bodies, has the potential to be an acid sulfate soil.”

With this addition, in my view the draft SAP for ASS adequately addresses its aim: “To minimise and mitigate adverse impacts from development occurring on land that contains potentially acid sulfate soils.”

5 CONCLUSIONS

The mapped areas of PASS in the residential and rural areas of Huon Valley municipality constitute a firm basis for compiling an Acid Sulfate Soils Specific Area Plan.

Under section 32(4) of the [Land Use Planning and Approvals Act 1993](#) the land reviewed in this supporting report needs to be subject of the SAP as it has .. *particular environmental, economic, social or spatial qualities that require provisions, that are unique to the area of land, to apply to the land in substitution for, or in addition to, or modification of, the provisions of the SPPs.*

With one addition (suggested here) the draft SAP is a suitable instrument to manage PASS in the municipality.

W. C. Cromer
Principal

This report is accompanied by and must not be separated from the following Attachments:

- Attachment 1. HVC PASS Assessment Detail Maps (11 pages)
- Attachment 2. Photographs of selected PASS sites in the Huon Valley municipality (4 pages)
- Attachment 3. Field notes (4 pages)





Table 1. Suggested changes to mapped PASS in Huon Valley municipality. Except for sites 18, 24 and 66, the changes have been included in the Detail Maps in Attachment 1.

Detail map	Site	GDA94		Marked change	Field notes
		Easting	Northing		
Southport	6	498289	5190903	Low PASS deleted	Shoreline along this part of Lady Bay Road at Southport has Permian bedrock outcrop.
Southport	8	499124	5190651	Low PASS deleted	View north over Permian bedrock outcrop on Burying Ground Point at the end of Roaring Beach Road. (No PASS) which is classified low risk; low PASS risk at southwestern end of beach but land steepens quickly at northeastern end of beach (suggest very low risk)
Dover	12	497639	5202437	PASS added	Looking upstream and northwest along Esperance River from bridge at Strathblane. Not shown as PASS.
Dover	14	501163	5204117	PASS added	View southwest from Bay View Road at Dover. PASS not mapped. Probably has low risk as it is a small inlet and bound by outcrop along shoreline
Dover	18	503757	5204476	Change not marked	Kent Beach near Glenbervie Rivulet outlet at Dover, looking south east along beach to cliffs. Suggest extremely low risk due to dunes on outcrop at waterline.
Castle Forbes Bay	24	497805	5223382	Change not marked	View north across Crowthers Bay towards Castle Forbes Bay: two small creek inlets either side of small point. Suggest no PASS above road in areas >10m away from creeks and on point outcrop.
Castle Forbes Bay	25	498236	5224621	PASS added	Swampy-marsh tidal flats embayment either side of Castle Forbes Bay Rivulet at Castle Forbes Bay. Not shown as PASS. Should be low risk PASS in intertidal ASS layers. Two photos with views south and southwest of Huon Highway.
Huonville	37	502839	5236528	PASS added	View north and upstream on west bank of Huon River: low risk flood plain bound by rock cliff to south, almost reaches road. Not marked as PASS
Cygnets	62	503772	5215441	Low PASS deleted	View south from Cygnets Coast Road east of Mills Road; rocky bay which climbs to cliffs quickly either end. Suggest PASS unlikely.
Cygnets, Port Huon	63	502345	5216027	Low PASS deleted	View southwest over Herlihy Bay from Cygnets Coast Road; bedrock outcrop on shore--no PASS. Suggest similar for low risk zone north of Kubes Road and Wheatleys Bay 1km northwest.
Cygnets	66	508227	5218888	Change not marked	View south over Gardners Bay from Channel Highway; probably similar PASS coverage as Nicholls Rivulet. No intertidal PASS has been mapped. 2 x photos.





Attachment 1

(11 pages including this page)

HVC PASS Assessment Detail Maps

Source of base maps: www.thelist.tas.gov.au

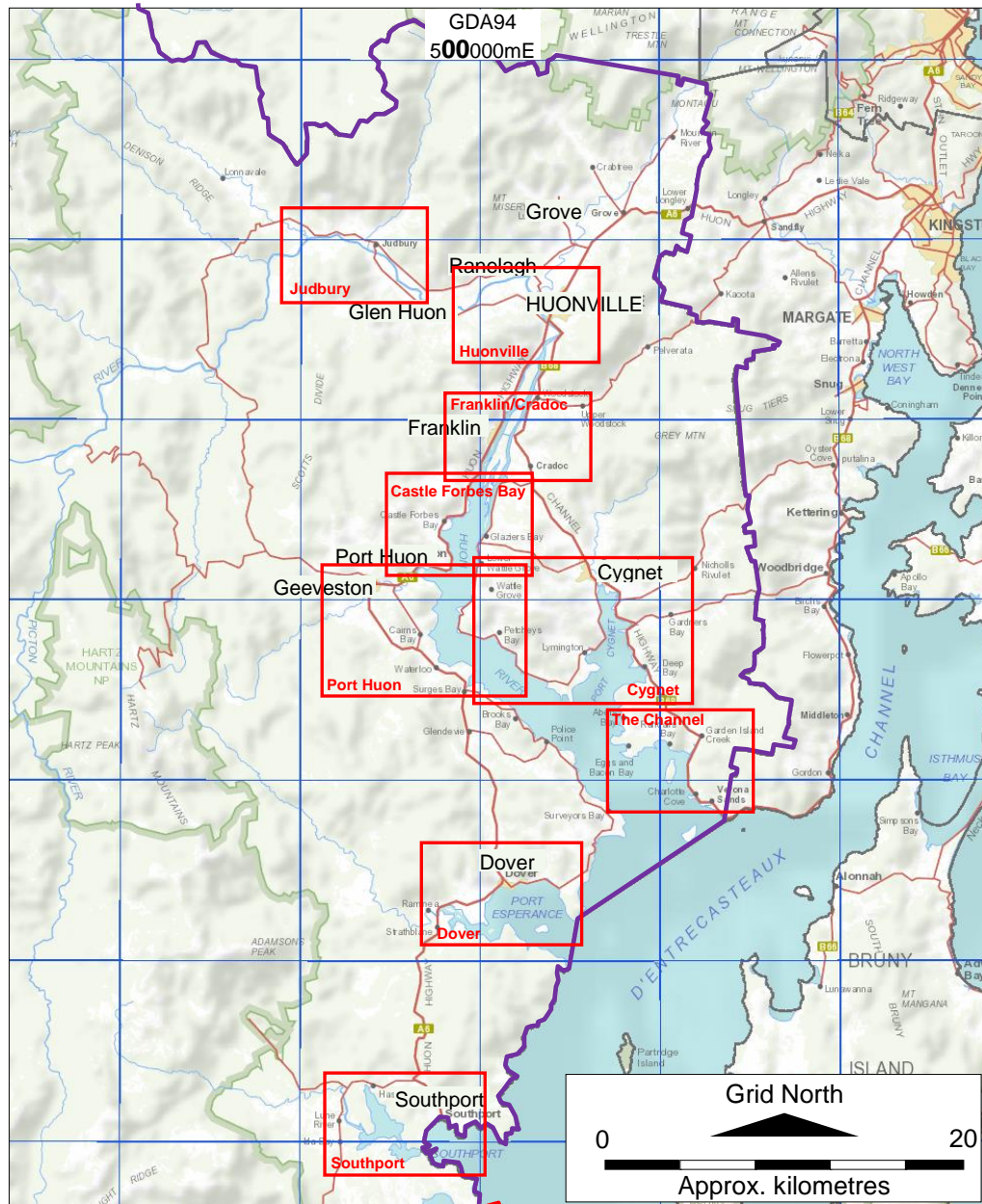
The nine Detail Maps are titled by town or locality name, and are arranged from north (Judbury) to south (Southport), as shown on the location map on the following page.

Photographs of selected sites are presented in Attachment 2.

Brief field notes of the numbered inspection sites shown on the Detail Maps are listed in the Table in Attachment 3.

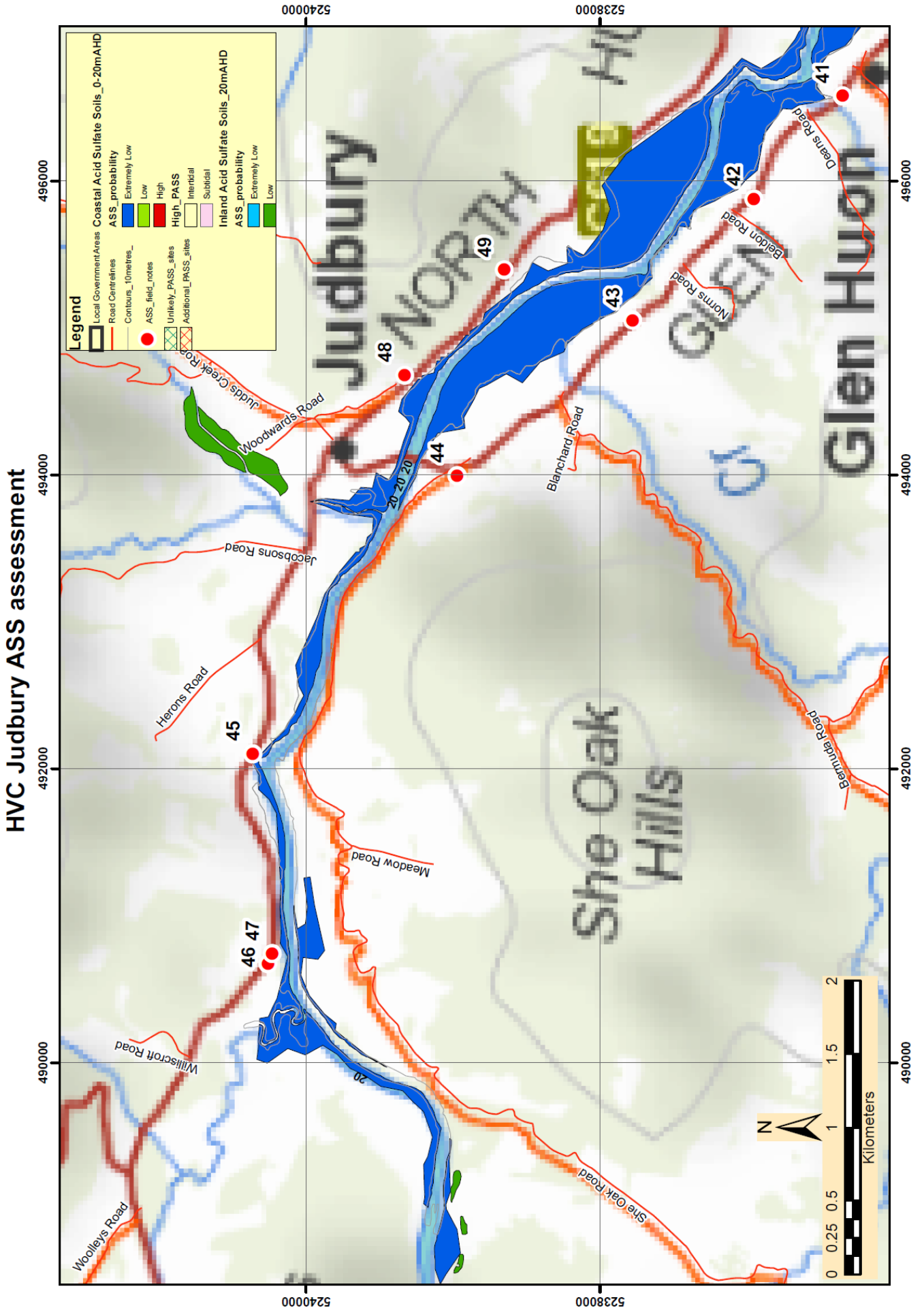
Table 1 in the body of the report lists 11 sites where (a) changes to the published PASS areas are suggested, or (b) no change is suggested but a comment is made in relation to the current PASS status.





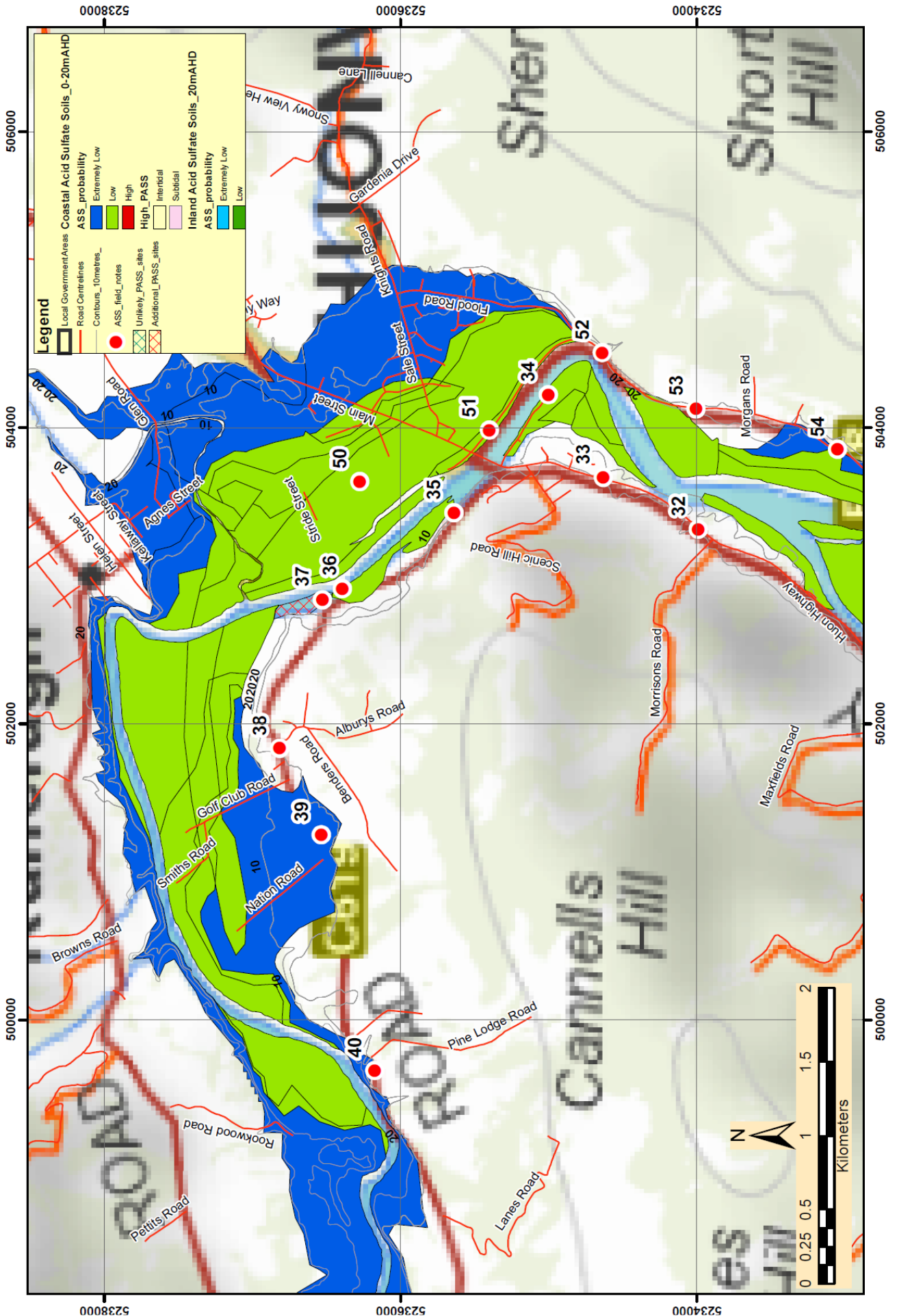
Location map of the eastern part of the Huon Valley Council Local Government Area (purple boundary). Seventy six sites in the nine red-bordered Detail Maps covering all coastal and subtidal/intertidal PASS areas were ground-truthed for the current report.





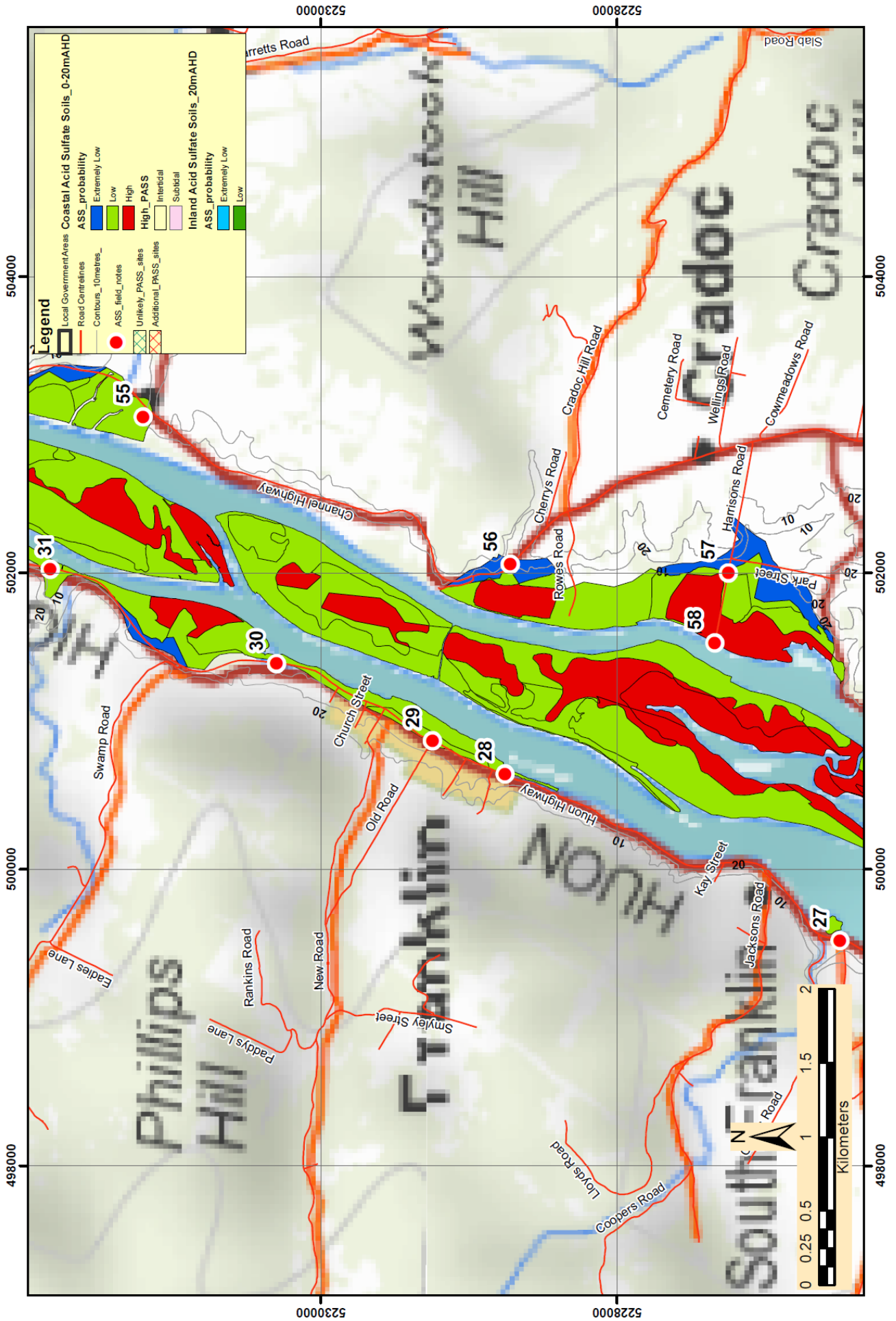


HVC Huonville ASS assessment





HVC Franklin/Cradoc ASS assessment





HVC Castle Forbes Bay ASS assessment







HVC Port Huon ASS assessment





HVC The Channel ASS assessment



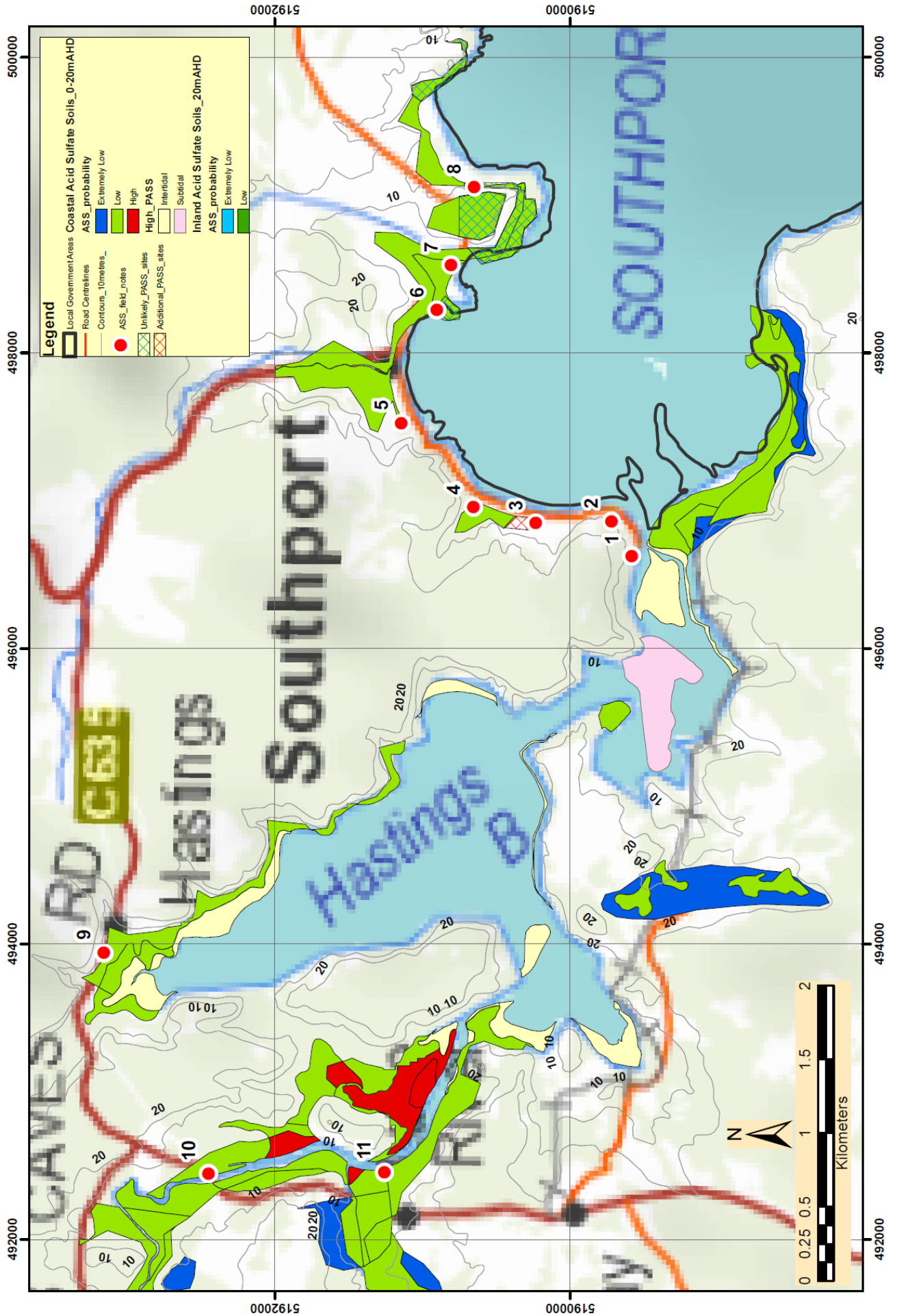


HVC Dover ASS assessment





HVC Southport ASS assessment





Attachment 2

(4 pages including this page)

Photographs of selected PASS sites in the Huon Valley municipality

Photography: G. Bremner (consulting geologist) 11 and 12 January 2022

The site numbers in the captions to the photographs correspond to the site numbers in Attachments 1 and 3.





Site 50 (above). View northwest along Wilmot Road at Huonville. The road crosses low PASS risk flood plains of the Huon River.

Site 56 (below). View southwest from the Channel Highway near Cherrys Road, on the eastern side of the Huon River (unseen in the distance). The foreground is extremely low and low risk PASS, with high PASS risk on the lower-lying flood plain (brown grass) in middleground.





Site 59 (above). View east from near Golden Valley Road junction with the Channel Highway in the centre of Cygnet. The grassed paddocks are an extremely low PASS risk part of the upper tidal zone of Agnes Rivulet.

Site 65 (below). View upstream along Nicholls Rivulet from the bridge over the Channel Highway; land on the north bank (at left) is low PASS, and it changes to extremely low PASS risk further upstream in the middle distance.





Site 73 (above). View southwest from the Channel Highway downstream over the tidal zone of Garden Island Creek. The low ground on the opposite side of the creek is mapped as low PASS near the trees in the distance, but the middleground should also be low PASS.

Site 30 (below). View northeast from near Swamp Road on the Huon Highway, towards the low and high PASS Egg Islands.





Attachment 3
(4 pages including this page)
Field Notes

Site numbers correspond to those in the Detail Maps in Attachment 1, and to the selected site photos in Attachment 2.

Bold entries (11 sites) denote a change to the mapped PASS status has been suggested. With the exception of sites 18, 24 and 66, the changes have been approximately marked on the Detail Maps.





Detail Map	Site	GDA94		Field notes
		Easting	Northing	
Southport	1	496628	5189584	On boat ramp looking south across Southport Narrows to a low risk zone on the opposite shore. PASS unlikely due to dolerite outcrop on shore further west.
Southport	2	496863	5189719	View southeast from near Aurora Court across Southport Narrows towards Deephole Bay. Area on opposite shore is beach and forest with left side of photo being dolerite on peninsula.
Southport	3	496847	5190234	Low lying area behind Kingfish Beach near Heather Street at Southport. Should possibly be included as PASS.
Southport	4	496956	5190654	Creek inlet near Kingfisher Cottage at northern end of Kingfish Beach, before rise to Permian bedrock around point.
Southport	5	497523	5191145	Large swampy flat inlet area west and inland of main jetty at Southport, between Huon Highway and Esperance Road..
Southport	6	498289	5190903	Shoreline along this part of Lady Bay Road at Southport has Permian bedrock outcrop. Suggest very low PASS.
Southport	7	498597	5190807	Walpole Creek mouth at Southport.
Southport	8	499124	5190651	View north over Permian bedrock outcrop on Burying Ground Point at the end of Roaring Beach Road. (No PASS) which is classified low risk; low PASS risk at southwestern end of beach but land steepens quickly at northeastern end of beach (suggest very low risk)
Southport	9	493940	5193158	Swampy inlet on southern side of South Cape Road at Hastings
Southport	10	492448	5192449	Looking north and upstream at Lune River from bridge on South Cape Road.
Southport	11	492455	5191260	From end of Lune Mill Road at Lune River, looking southeast across Lune River to high risk area and steep hill directly behind.
Dover	12	497639	5202437	Looking upstream and northwest along Esperance River from bridge at Strathblane. Not shown as PASS.
Dover	13	497667	5202684	Esperance River looking east and downstream from Huon Highway into more open river section..
Dover	14	501163	5204117	View southwest from Bay View Road at Dover. PASS not mapped. Probably has low risk as it is a small inlet and bound by outcrop along shoreline
Dover	15	501836	5203908	Looking northeast onto Dover Beach with Dover Rivulet outlet onto beach
Dover	17	503737	5204529	The mouth of Glenbervie Rivulet at Dover, looking north and upstream from Kent Beach Road.
Dover	18	503757	5204476	Kent Beach near Glenbervie Rivulet outlet at Dover, looking south east along beach to cliffs. Suggest extremely low risk due to dunes on outcrop at waterline.
Port Huon	19	499368	5215214	View west from Huon Highway over small lagoon area at Sturges Bay; lagoon bound north and south by bedrock.
Port Huon	20	497813	5216481	View northwest across Waterloo Bay from Lumsdens Road at Waterloo.
Port Huon	21	498278	5216250	View east from Lumsdens Road at Waterloo over Little Flights Bay. Low risk potential under road and in bay. Bound by bedrock.
Port Huon	22	495912	5221006	View east and downstream from Whale Point Road over Kermandie River at Kermandie.
Port Huon	23	496218	5221383	View northeast and downstream from boardwalk opposite Doodys Hill Road at Kermandie, into Hospital Bay.
Castle Forbes Bay	24	497805	5223382	View north across Crowthers Bay towards Castle Forbes Bay: two small creek inlets either side of small point. Suggest no PASS above road in areas >10m away from creeks and on point outcrop.
Castle Forbes Bay	25	498236	5224621	Swampy-marsh tidal flats embayment either side of Castle Forbes Bay Rivulet at Castle Forbes Bay. Not shown as PASS. Should be low risk PASS in intertidal ASS layers. Two photos with views south and southwest of Huon Highway.





Detail Map	Site	GDA94		Field notes
		Eastings	Northing	
Castle Forbes Bay	26	499189	5225737	View northeast from Huon Highway across Huon River towards high and low PASS on southernmost Egg Islands
Franklin/Cradoc	27	499521	5226494	View northeast from the Huon Highway- Braeside Road junction near South Franklin, across swampy tidal flats.
Franklin/Cradoc	28	500646	5228755	View south along Huon River at Franklin towards Egg Islands.
Franklin/Cradoc	29	500867	5229245	Campgrounds and oval at Franklin on flood plain of Huon River. 2 x photos.
Franklin/Cradoc	30	501389	5230300	View northeast towards Huon River divide, over flat marsh area near Swamp Road.
Franklin/Cradoc	31	502027	5231827	View west of Clarks Rivulet crossing on Huon Highway
Huonville	32	503316	5233989	View southeast from Huon Highway near Morrisons Road junction, across Huon River to swamps and lowland flood plains
Huonville	33	503665	5234632	View northeast from Huon Highway towards bend in Huon River, and flood plains with swampy marsh.
Huonville	34	504224	5235003	View east from Coolstore Road at Huonville over higher ground; rock noted in housing development areas.
Huonville	35	503426	5235640	View northwest and upstream over low risk flood plain of Huon River
Huonville	36	502914	5236393	View north across to northern bank of Huon River at upstream end of Waltons
Huonville	37	502839	5236528	View north and upstream on west bank of Huon River: low risk flood plain bound by rock cliff to south, almost reaches road. Not marked as PASS
Huonville	38	501835	5236818	View north from Glen Huon Road near Alburys Road, over low risk flood plains of Huon River. 3 x photos.
Huonville	39	501250	5236534	View north from Glen Huon Road near Nation Road, over low risk flood plains of Huon River.
Huonville	40	499657	5236175	View north towards Huon River from Glen Huon Road near Huon Lawn Cemetery. Possibly narrower area of PASS than indicated (<10m from river); definitely does not reach road.
Judbury	41	496569	5236355	View north from Glen Huon over extremely low risk Huon River flood plain.
Judbury	42	495872	5236959	View north from near Eldon Road near Glen Huon over extremely low risk Huon River flood plain.
Judbury	43	495052	5237779	View north from near Norms Road near Glen Huon over extremely low risk Huon River flood plain.
Judbury	44	493995	5238971	View north from Glen Huon Road towards Judbury over extremely low risk Huon River flood plain.
Judbury	45	492096	5240360	View south from Lonnvale Road over Huon River towards extremely low risk flood plains. She Oak Hills (dolerite) on opposite side of Huon River.
Judbury	46	490673	5240258	View southwest from Lonnvale Road towards Russell River junction on Huon River; extremely low risk Huon River flood plain.
Judbury	47	490746	5240230	View west from Lonnvale Road towards Russell River junction on Huon River; extremely low risk Huon River flood plain.
Judbury	48	494677	5239329	View southwest from North Huon Road near Judbury; extremely low risk Huon River flood plains.
Judbury	49	495394	5238651	View southwest from North Huon Road; extremely low risk Huon River flood plains.
Huonville	50	503637	5236275	View northwest along Wilmot Road at Huonville. The road crosses low PASS risk flood plains of the Huon River.





Detail Map	Site	GDA94		Field notes
		Easting	Northing	
Huonville	51	503986	5235401	Views northeast and northwest from Channel Highway at Huonville; river bank area and flood plains of Huon River. 2 x photos.
Huonville	52	504508	5234638	View west from Channel Highway towards Herons Point near Huonville; low PASS river bank area and flood plains of Huon River.
Huonville	53	504128	5234004	View west from Channel Highway north of Morgans Road across low risk flood plain of Huon River
Huonville	54	503857	5233056	Views southwest and northwest from Channel Highway near Linnells Road, over low risk flood plains of Huon River. 2 x photos.
Franklin/Cradoc	55	503054	5231199	View southwest from Channel Highway at Woodstock, over low risk flood plains of Huon River.
Franklin/Cradoc	56	502058	5228720	View southwest from Channel Highway near Cherrys Road, over low risk flood plain of the Huon River.
Franklin/Cradoc	57	502001	5227249	View west from Harrisons Road towards a high PASS area on the eastern side of the Huon River.
Franklin/Cradoc	58	501529	5227340	Views of the Huon River from the western end of Harrison Rd- 3 x photos (2 of islands in river, 1 of tea tree/swamp high risk zone).
Cygnnet	59	506143	5221561	View east from Channel Highway near Golden Valley Road at Cygnnet, over extremely low risk upper tidal zone of Agnes Rivulet.
Cygnnet	60	506420	5220965	View southeast from the start of Lymingto Road at Cygnnet, over the tidal mouth of Agnes Rivulet; mapped as Low risk but might be higher risk.
Cygnnet	61	506204	5217284	Views northwest and upstream, and southeast and downstream, from Lymington Road, of the tidal mouth of Forsters Rivulet at Lymington. Noted in marine subtidal PASS. 2 x photos.
Cygnnet	62	503772	5215441	View south from Cygnnet Coast Road east of Mills Road; rocky bay which climbs to cliffs quickly either end. Suggest PASS unlikely.
Cygnnet, Port Huon	63	502345	5216027	View southwest over Herlihys Bay from Cygnnet Coast Road; bedrock outcrop on shore--no PASS. Suggest similar for low risk zone north of Kubes Road and Wheatleys Bay 1km northwest.
Cygnnet	64	504662	5215344	View south from Lymington Road towards Gourlays Bay on the Huon River; the extremely low risk zone could be low risk PASS.
Cygnnet	65	507757	5220148	Views upstream and downstream along Nicholls Rivulet from the Channel Highway; land on north bank is low PASS. 3 x photos.
Cygnnet	66	508227	5218888	View south over Gardners Bay from Channel Highway; probably similar PASS coverage as Nicholls Rivulet. No intertidal PASS has been mapped. 2 x photos.
Cygnnet	67	508470	5217295	View south from Channel Highway over Purcells Bay; Rocky Bay Creek outlet to shallow beach mudflat.
Cygnnet	68	509409	5215934	View south from Channel Highway over Deep Bay and the mouth of Deep Bay Creek; mapped as low PASS.
Channel	69	509911	5212281	View northwest from Randalls Bay Road upstream at un-named creek behind foredunes; mapped as low PASS.
Channel	70	509660	5212039	View northwest from Randalls Bay Road across mouth of un-named creek behind foredunes; mapped as low PASS.
Channel	71	509460	5212082	View south from Randalls Bay Road on higher ground at Randalls Bay; not mapped as PASS.
Channel	72	508188	5211622	View east at Eggs and Bacon Bay; creek exit onto beach near bridge.
Channel	73	512128	5211879	View southwest from Channel Highway downstream over tidal zone of Garden Island Creek.
Channel	74	511654	5211327	View northwest from Channel Highway towards Garden Island Sands, over tidal mouth of Garden Island Creek. All mapped as Low PASS.
Channel	75	512446	5208578	View east from Westwood Avenue at Verona Sands, across mouth of Lasts Creek.
Channel	76	512725	5208526	View northeast from western end of Lovering Avenue at Verona Sands: over tidal zone of Lasts Creek. Mapped as low PASS.

